CLOSURE OF AN X-RAY DEPARTMENT IN A RURAL HOSPITAL

By: Erika Lee and Danica Avery

Home for the Summer Program - June to July 2018

Gimli, Manitoba

Supervisors: Dr. J Chan and Dr. D Thompson

Abstract

The X-Ray department at the Gimli Primary Health Care Centre closed for renovations for one month in June of 2018. The purpose of this study is to provide an overview of Gimli's X-ray department and EMS demographics and procedures that were carried out during the X-ray renovations. A survey was sent to the staff for overall satisfaction with the changes that occurred during the renovations. The costs of additional transport during the renovations was also determined. Survey results were collected from nine persons. The study found that staff satisfaction was positive with common suggestions for more communication between the affected departments and staff. Altogether, the process carried out for a required reroute of Gimli's imaging services during renovation and installation of new equipment was considered effective.

Gimli Community Background

The Rural Municipality of Gimli covers a land area of 319.25km^2 and houses a population of 5,845 as of the 2011 census. 31.1% of the population was aged 65 years and older, in comparison to the national average of 14.8%. 58.1% of the population falls into the working age population (ages 15-64) and 10.9% are children (ages 0-14); both lower than the national averages of 68.5% for the aged 15-64 population and 16.7% for the population of children aged 0-14 years (Fig 1). The median age in the Rural Municipality of Gimli is 56.2 years, 17.8 years above the national average of 38.4 years. The population of the Rural Municipality of Gimli does increase significantly during the summer months due to the large number of cottages and summer homes in the area as well as tourist traffic. (1,2)

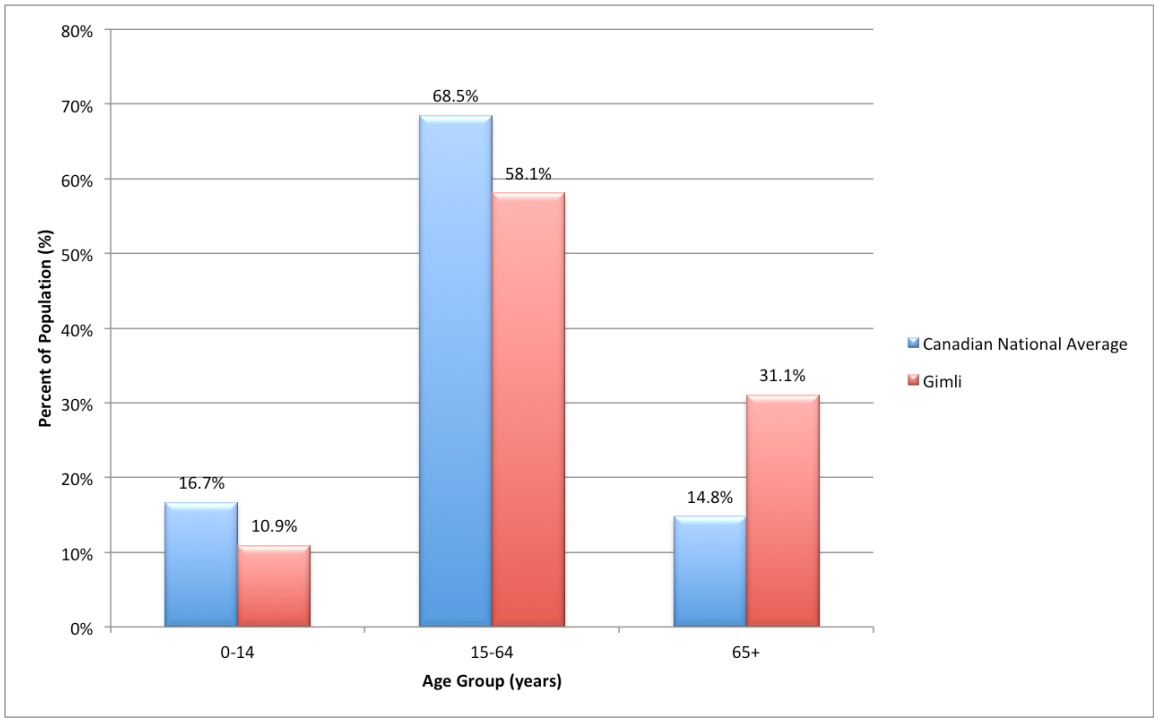

Fig 1. A comparison of percent of the population of three different age group categories in Gimli, Manitoba versus Canada's National Average.

The Rural Municipality of Gimli falls into the Interlake-Eastern Regional Health Authority. The Interlake-Eastern Regional Health Authority covers an area of 61,000km^2. The region has a population of 126,000. As of September 2015, there are 10 hospitals, 16 long term care sites, 6 primary care centres, 17 EMS (Emergency Medical Services) stations, one quick care clinic and 6 dialysis sites all staffing 3,100 healthcare professionals. (3)

Hospital and Clinic Background

The new Gimli Community Health Centre was built in 2004 allowing an expansion and improvement in the facilities such as diagnostic services, palliative care and a broader spectrum of health services. The Johnson Memorial Hospital is located in the Gimli Community Health Centre. The hospital emergency department is staffed by a rotating schedule of doctors from the Gimli Clinic, usually working in 24-hour on-call shifts. It is also staffed by nurses, healthcare aids, ward clerks and a physician's assistant. Gimli Clinic is currently staffed by six doctors as well as clinic clerks.

X-Ray Department Background

Diagnostic Imaging and Lab Services at Gimli Community Health Centre includes X-ray services, electrocardiograms and phlebotomy lab work. These services are used by the patrons of the Gimli Health Care Clinic, inpatient- and emergency- hospital services, as well as other members of the community. It is open from 8:00am-3:45pm Monday to Friday, closed for an hour at lunch. However, there is a technician on-call at all other hours for any emergent cases. On average it serves 436 patients a month: which is 54% outpatient, 33.3% emergency room patients and 12% hospital inpatients.

Due to aging, 21 year old, equipment from May 1997 in the X-Ray Department at Gimli Community Health Centre, it was decided to replace the old equipment with new, more reliable imaging equipment. Thus, this would prevent a sudden, unplanned interruption if the old equipment was to break down.

During the closure, patients requiring X-Rays in Gimli were diverted to other X-Ray departments in the region. The three closest are Teulon, a 30 minute drive from Gimli Community Health Care Centre, Arborg, a 30 minute drive and Selkirk, a 40 minute drive. Non-urgent patients were given instructions to present to another facility during regular hours, Monday-Friday 8:00am-4:00pm. Urgent and ambulatory patients during regular hours, were asked to present to another department. After hours, they would go to Teulon and the X-Ray technician would be called in. Emergency patients would be transported via EMS services to another hospital and then returned after imaging. If emergency medical care was needed, then the patient would be transported to a hospital with a doctor present such as Selkirk.

Gimli Regional Health Centre does have a portable X-Ray machine. However, due to concerns over radiation protection, as well as limitations of quality the use of the mobile radiography was not expanded beyond its regular usage. Typically it is only used emergent situations where the patient could not otherwise be transferred to the X-Ray suite under normal circumstances.

Methods

Information on Gimli's X-ray department and EMS demographics was obtained through Gimli's clinical team managers, clerks, as well as EMS head coordinators.

In addition, a survey of 6 questions generated via SurveyMonkey.com was sent to all staff of the Gimli Primary Health Care Centre one month following the end of the

renovations. Two questions asked staff to report satisfaction with logistics and patient care respectively during X-ray renovations on a Likert-like scale. The remaining 4 questions were open-ended survey questions asking staff to describe their positive and negative experiences, as well as what would have been done differently. The survey also asked to state the role of the responder.

Results

Emergency patients not stable enough or otherwise unable to be transported by their own means (such as by a family member or friend), as well as inpatients were transported to other hospitals by EMS. The base fee for this transportation is approximately $330.00, and is $3.30 for each kilometer. There is also an additional charge of $100.00 per additional hour if there is more than an hour wait (the first hour is free). Thus, transport from Gimli to Selkirk would be $330.00 base fee and an additional $194.40 for the kilometers traveled for a total of $521.40 each way. This equates $1042.80 for transportation for a single person to get x-ray imaging, assuming no additional wait time is required. On an average month, the X-ray department sees 52 in-patients and 145 emergency department patients. However, over the renovations stable patients from the emergency department were transported by family or friends and thus not all required EMS transport.

In the survey, when asked about their level of satisfaction of the logistics during the X-Ray Department renovations all respondents reported feeling either neutral, satisfied or very satisfied with one responding very satisfied, four responding satisfied and three as neither satisfied nor dissatisfied. One respondent skipped this question and no respondents reported levels of dissatisfaction (Figure 2).

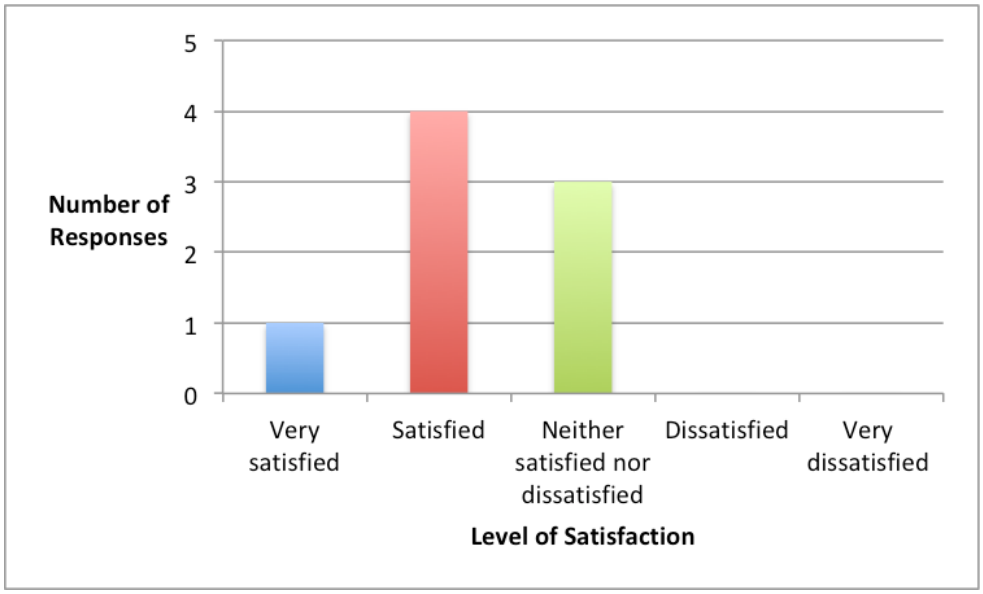

Fig 2. Reported levels of satisfaction from health care team members with regards to the logistics during the X-Ray department renovations

As with levels of satisfaction with the logistics, when asked about their level of satisfaction of the patient care all respondents reported feeling either neutral, satisfied or very satisfied. One person was very satisfied, six responding satisfied and one as neither satisfied nor dissatisfied. One respondent reported dissatisfaction with patient care during the renovations (Figure 3).

Fig 3. Reported Levels of satisfaction from health care team members with regards to patient care during the X-Ray Department Renovations

Our survey found that the most challenging aspect of the renovations for the respondents was difficulty transferring patients to leading to increased time spent in patient assessment and delays in scheduled EMS patient transfers and emergent calls. One respondent also reported that the reroute created an operational impact that tied up EMS resources for the rest of the region. Another challenge identified was the inconvenience that was created for patients having to drive extra kilometers to the next X-ray machine.

When asked what was done to overcome these challenges, one respondent said ambulances further than the normal radius were utilized. Three respondents stated that communication between departments streamlined patient transport to the other X-ray department. Regarding the challenge of confusion surrounding where to send patients, one respondent simply referred to standard procedures for which external lab to send patients (i.e. send first to the nearest lab, and if closed or emergent, send to Selkirk), and one stated that communicating to patients and families about the benefit of new equipment helped the most. Two respondents did not identify any challenges during this time.

Respondents varied in responses when asked what could have been done differently. Three respondents felt nothing could be improved, two preferred if some form of communication and plan was reiterated before the start of renovations. A few suggestions were brought forward with this question, such as increasing patient awareness of the renovations, having the renovations during the less busy winter months, and utilizing the portable x-ray.

Lastly, respondents were asked to state their role on the health care team. We received responses from a maintenance personal, EMS Operations Supervisor, Home Care Case Coordinator (RN, BN), two clinical team managers, a medical clerk, ER registration clerk, and an EMS officer.

Discussion

Every department in health care must be considered when upgrading a medical service in order to minimize interruption to patient care. For the hospital, transportation of a single patient from Gimli to Selkirk for imaging would cost a minimum of $1042.80. Although costs such as these are expected and necessary, things could have been done to minimize costs. For example, making more use of the portable x-ray in situations it would have been suitable or having the renovations during Spring or Fall

when Gimli is less busy, thus having less transportations required during the renovations.

The population of the Rural Municipality of Gimli increases significantly during the summer months, thus Gimli Community Health Centre sees much higher traffic during these months. This is significant due to the respective increase in use of the X-ray machines in the summer. As well, staff are busier dealing with the increased traffic. Thus, in future, renovations resulting in the closure of a department may benefit from being held during Spring or Fall months. Not only would there be less traffic, but the staff would have more time to help deal with any additional work that comes up during renovations. However, may be recommended to avoid Winter months, although the quietest months in Gimli, storms and poor road conditions could impair ability for transport, increase time of transport and increase risks during transport.

Aside from costs for the health authority, there is also the large issue that transporting a patient for x-ray imaging would tie up EMS vehicles and the emergency medical technicians (EMTs) for a minimum of two hours. EMS are required to remain with patients if transported to another diagnostic imaging department and expected to return to Gimli, which translates to more time spent waiting. In order to help deal with this, ambulances were utilized from other further away communities. Transport time is critical with emergent patients and delay can result in detrimental effects on the care of patients. One respondent was quoted to have wanted “consideration of impact on EMS resources when projects like this are considered”. In future, more planning should be done with EMS coordinators to ensure all issues are addressed prior to the commencement of renovations or other department closures.

Front-line staff such as medical clerks, nurses, and doctors are also very important links in the chain of patient care during renovations. When there was coordination between EMS, hospital admin, front-line staff, quick transport of patients to other facilities was possible. Miscommunication between the teams can lead to serious lapses in patient care. An example quoted from the survey stated that during the renovations, miscommunication between EMS and nursing/physician led to a patient with a suspected hip fracture to be unnecessarily lifted from stretcher to bed and back again. Many survey participants also wished for more clear instructions to follow during the closure. Increased communication between different departments and staff, as well as organized, clear, easy-to-follow plans are essential for ensuring quality patient care during renovations and closures.

Overall, staff satisfaction of the logistics and patient care during X-ray renovation was positive on the satisfaction scale. 77.78% felt very satisfied or satisfied with patient care as compared to 62.5% feeling very satisfied or satisfied with logistics. 37.5% of respondents felt neither satisfied nor dissatisfied with logistics. No respondents were dissatisfied with logistics, however one respondent was dissatisfied with patient care. In future situations where resources are temporarily limited, more planning could be put in to logistical preparation to ensure that the levels of satisfaction with logistics can reach that of patient care.

An interesting suggestion as a alternative to sending patients to other facilities was to utilize the portable x-ray more. This technology could be useful in an emergency department, along with clinical judgement, to quickly determine if a case is emergent and must be sent to a tertiary care centre, or if a different course of action must be taken immediately. For example, a portable X-ray could help dictate if a patient's onset of shortness of breath is from a pneumothorax that must be drained with a chest tube, or from another cause that can wait to be established.

However due to safety concerns of radiation, certain criteria must be met before a patient can be X-rayed with the portable machine . Patients must be bedridden and unable to sit up for a conventional PA (posterior-anterior) X-ray. In addition, image quality is limited with a portable X-ray and may actually lead to more radiation if higher resolution imaging is required anyways. In addition, the literature is lacking in research regarding portable X-ray safety and effectiveness versus fixed X-ray machines. (4) For now, in future situations of imaging renovations a clinician has to weigh the risk of radiation against the emergent nature of the case and decide whether the patient is stable enough to be transported to proper imaging.

Limitations of this study include a small sample size of survey participants. Only nine responses were gathered from Gimli staff members. Furthermore, there were no responses from physicians, health care aides and other allied health professionals, nor the physician's assistant. These are all important members of the healthcare team and thus the study is limited lacking their differing viewpoints.

Stemming from this study, further research could be targeted to see how the renovation of the x-ray department affects its traffic, demographics and survey patient satisfaction in the future. A retrospective chart review of patient outcomes during the renovations could also be done to determine if it differed from times when the X-ray department is open. It would also be interesting to direct questioning to portable X-rays and whether

safety and picture quality could also provide high quality patient care during imaging machine replacement.

Conclusion

This study describes the impact that the Gimli hospital X-ray renovations had on cost, transport logistics, patient care perception, and staff satisfaction. Additional costs per person to transport to the nearest centre with an X-ray and CT totaled a minimum of $1042.80. Results from the staff satisfaction survey found that staff was satisfied with the protocol changes during the renovations and found it a necessary upgrade to aging imaging equipment. However, survey respondents felt that increased planning and better communication would have improved the process. This article provides an overview of a successful renovation of a rural, small-centre primary care hospital imaging department with minor interruption to patient care. Surveys on patient satisfaction could be addressed in subsequent studies.

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